Space Radiation Environment

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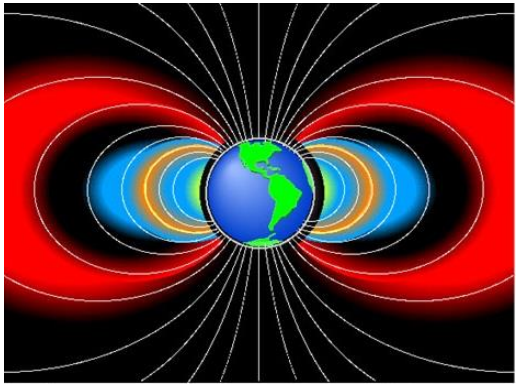
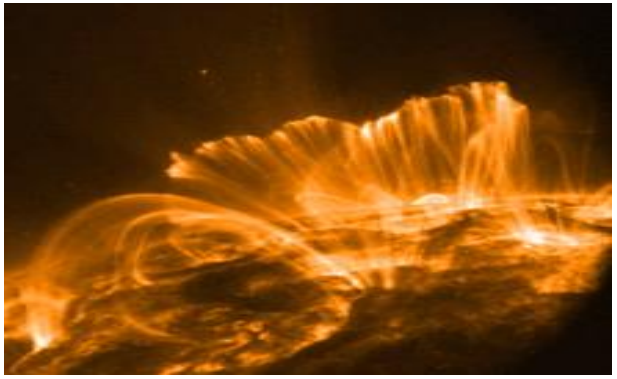
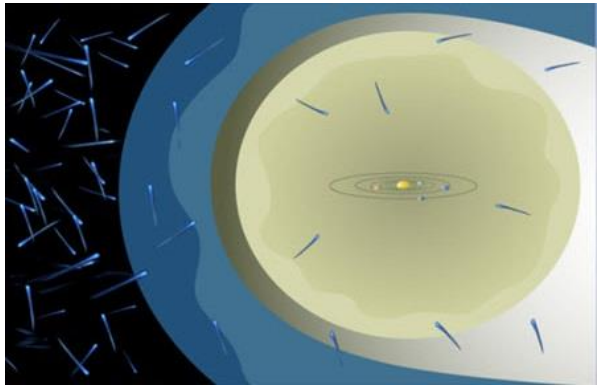
Three Primary Sources of Space Radiation in the Natural Environment



Trapped Radiation Belts

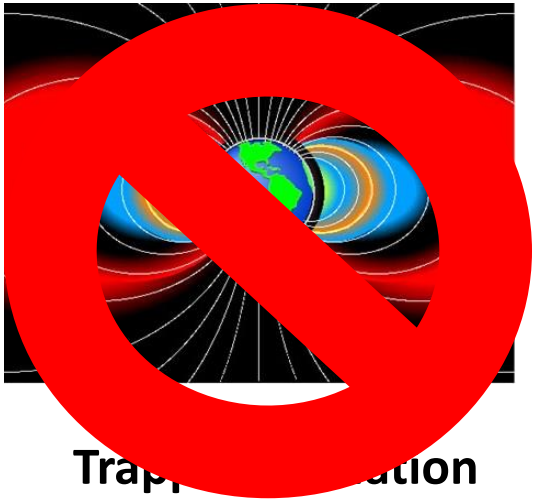


Solar Energetic Particles (SEPs)

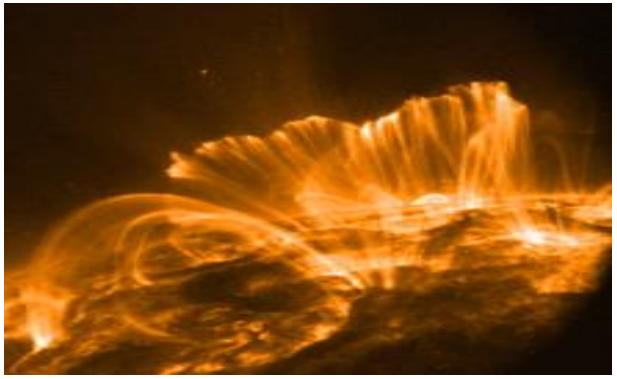


Galactic Cosmic Rays (GCRs)

Three Primary Sources of Space Radiation in the Natural Environment



Trap[illegible]ation Belts



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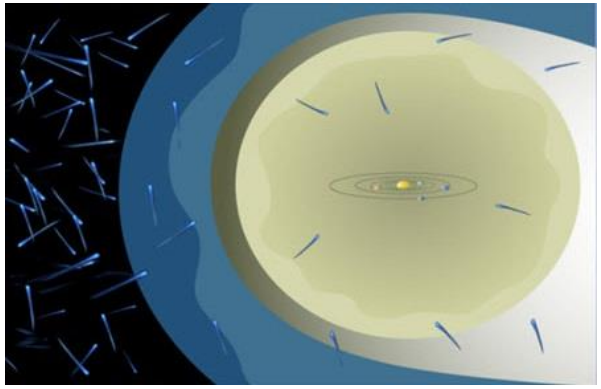
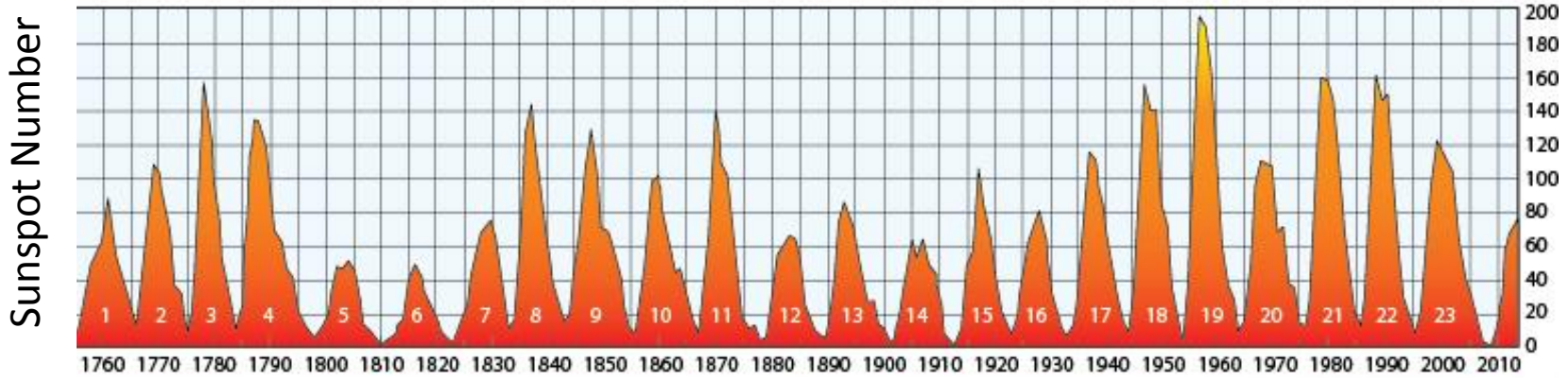
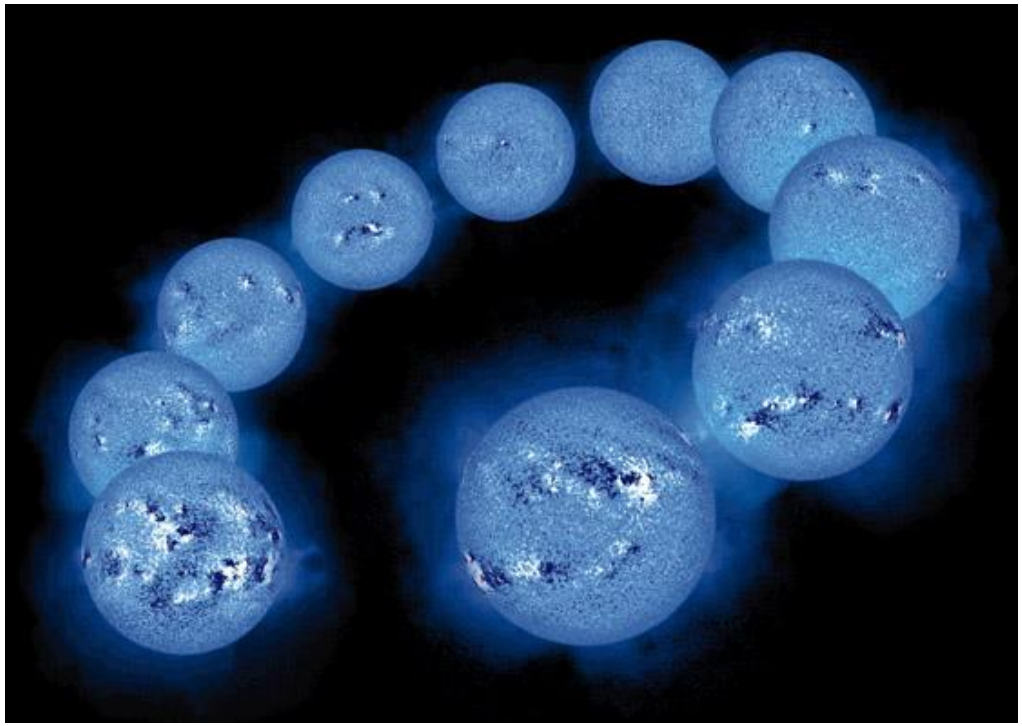


Galactic Cosmic Rays (GCRs)

Topics for Today

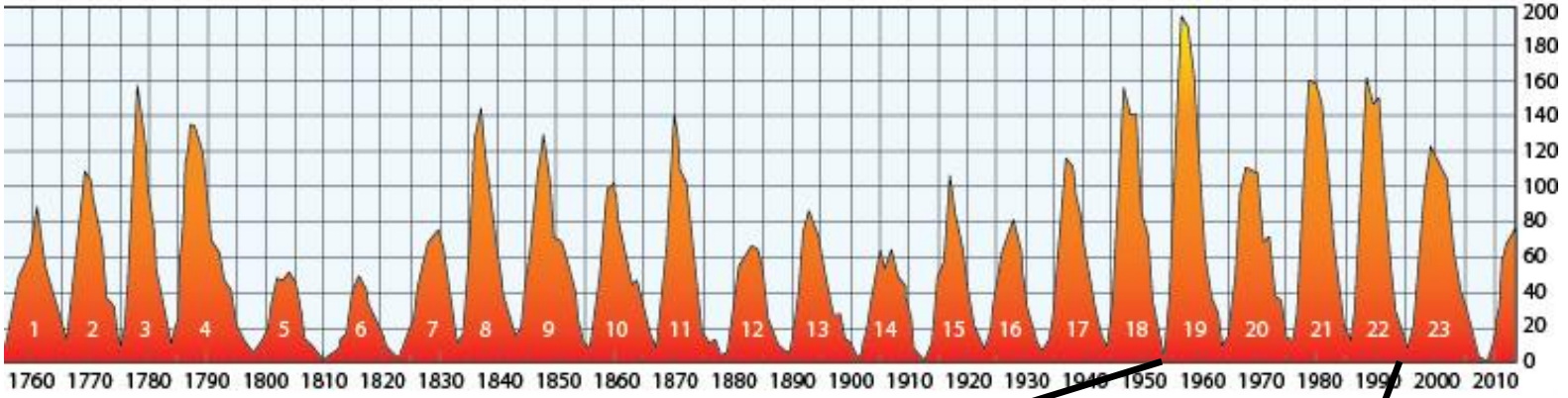
The Sun is a Magnetically-Variable Star





The Solar Activity Cycle Modulates SEPs

Most SEP events occur during solar activity maximum



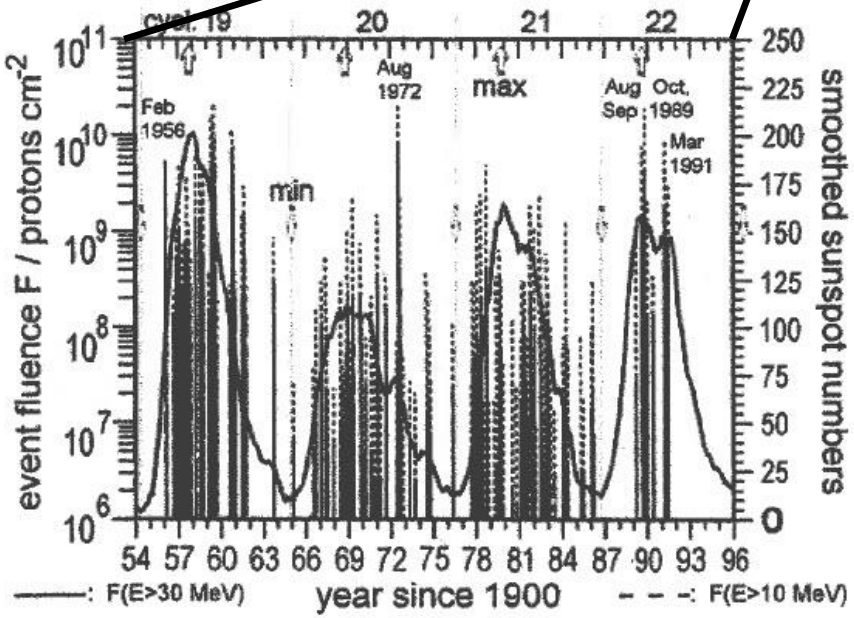
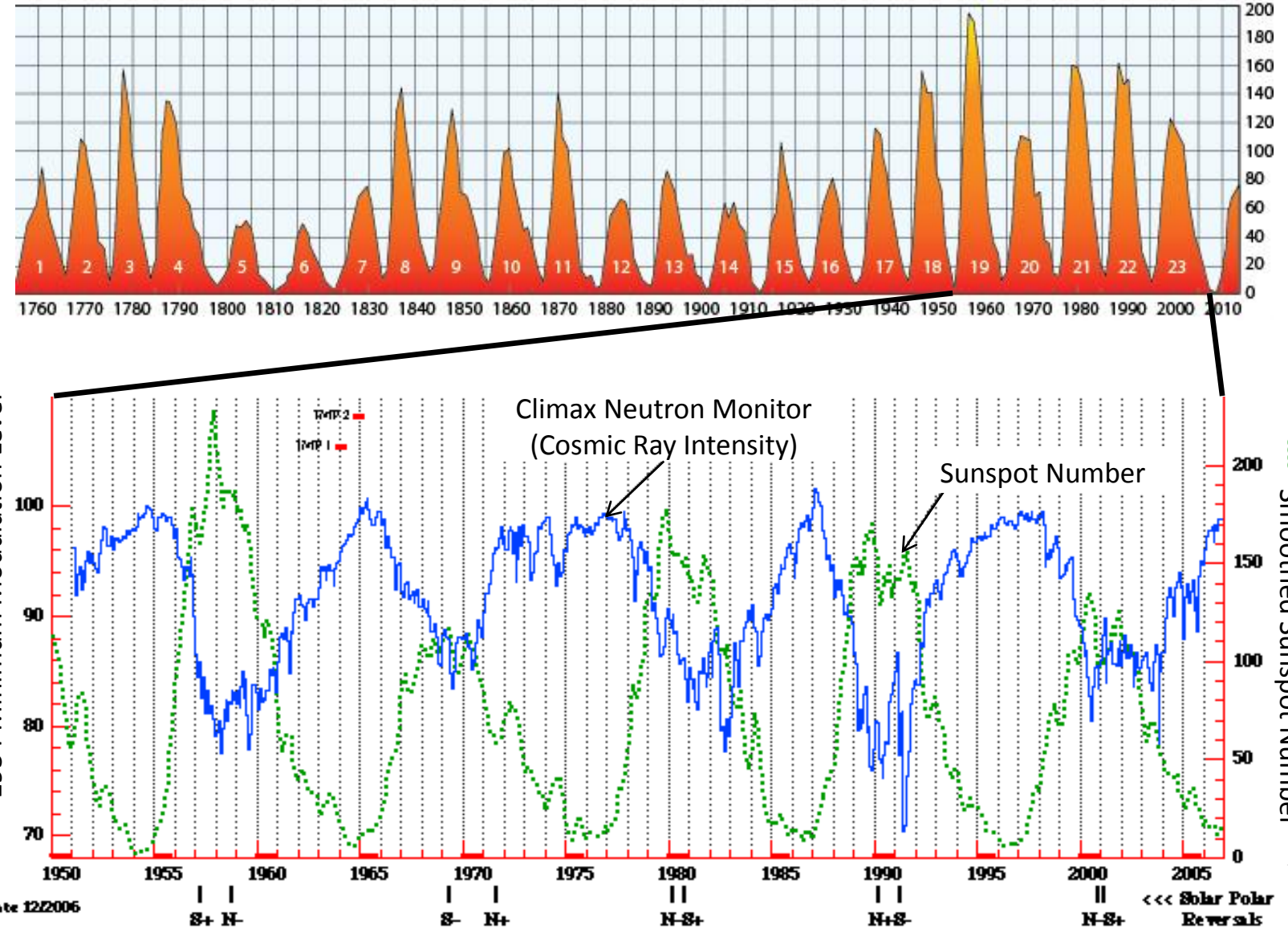


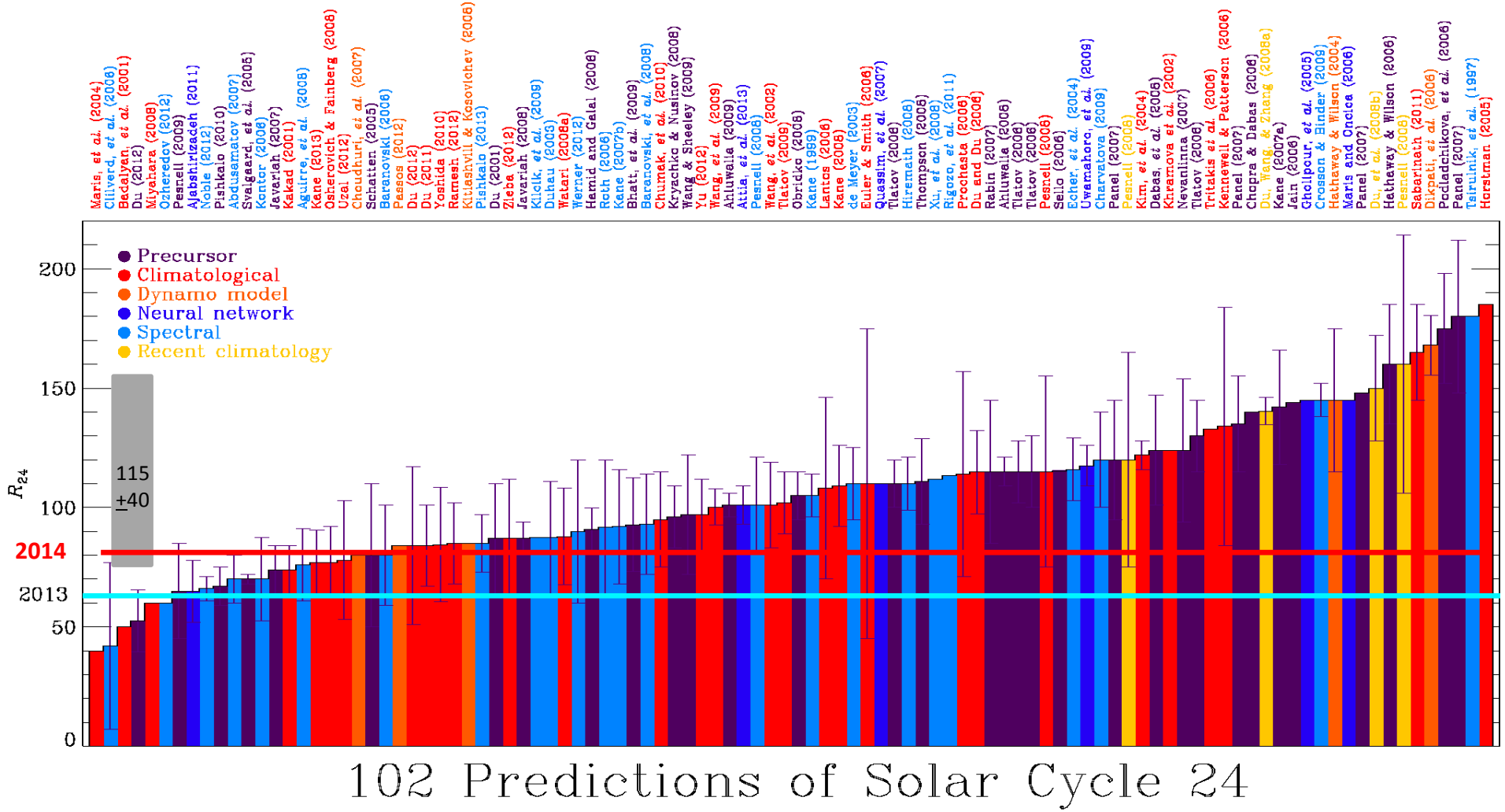
Figure 11.8. Occurrence of major and extreme solar particle events in solar cycles 19–22.

The Solar Activity Cycle Modulates GCRs



How Well Can We Predict the Solar Activity Cycle?

How Well Can We Predict the Solar Activity Cycle? [Not very well…]



Pesnell, 2012

Space Radiation Presentations

Overview

- Mars Mission and Space Radiation Risks — *Steve Davison, NASA-HQ, 30 min*
- Health Standards Decision Framework — *David Liskowsky, NASA-HQ, 10 min*

Space Radiation Environment

- Introduction — *Chris St. Cyr, NASA-GSFC, 5 min*
- Solar Energetic Particles — *Allan Tylka, NASA-GSFC, 30 min*
- Comparison and Validation of GCR Models — *Tony Slaba, NASA-LaRC, 30 min*
- GCR Radiation Environment Predictions — *Nathan Schwadron, Univ. of NH, 30 min*
- Emerging GCR Data from AMS-2 — *Veronica Bindi, Univ. of Hawaii, 30 min*

Radiation Health Risk Projections — *Eddie Semones, NASA-JSC, 45 min*

- NCRP Recommendations, Permissible Exposure Limits, Space Radiation Cancer Risk Model, Operations and In-Flight Solar Particle Event Mitigations

Space Radiation R&T for Risk Mitigation — *Lisa Simonsen, NASA-LaRC, 45 min*

- Radiobiology Research Portfolio (Cancer, CNS, Cardio) and Spacecraft Shielding Design, Analysis, and Optimization